


# TAPE DRIVE DEVICE AND RECORDING MEDIUM

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 Applicant: SONY CORP  
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 - european: G11B15/18B  
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## Abstract of JP2000182293

**PROBLEM TO BE SOLVED:** To realize unloading at a specified position. **SOLUTION:** Once receiving an eject command from a host computer, this device decides the contents of a loading point enable flag FL311b. When it is decided that a loading point enable flag FL311a indicates, for instance, '1' namely, is effective, a device area right before the partition specified by the loading point enable flag FL311a or an optional device area begins to be searched for. When the desired device area is reached, a required unloading processing is performed and a tape cassette 1 is ejected.

(a) FL311

Volume Information Checksum	1byte
Eject Status	22bytes
Rest Diagnostics	4bytes
Reserved	1byte
Initiation Count	9bytes
Volume Information Ch Type	8bytes

FL311

(a) FL311 (72bytes)

Reserved	4bytes
Reserved	1byte
Load Point	1byte
Reserved	b0, b1, b2, b3, b4, b5, b6, b7, b8, b9, b10, b11, b12, b13, b14, b15, b16, b17, b18, b19, b20, b21, b22, b23, b24, b25, b26, b27, b28, b29, b30, b31, b32, b33, b34, b35, b36, b37, b38, b39, b40, b41, b42, b43, b44, b45, b46, b47, b48, b49, b50, b51, b52, b53, b54, b55, b56, b57, b58, b59, b60, b61, b62, b63, b64, b65, b66, b67, b68, b69, b70, b71, b72, b73, b74, b75, b76, b77, b78, b79, b80, b81, b82, b83, b84, b85, b86, b87, b88, b89, b90, b91, b92, b93, b94, b95, b96, b97, b98, b99, b100, b101, b102, b103, b104, b105, b106, b107, b108, b109, b110, b111, b112, b113, b114, b115, b116, b117, b118, b119, b120, b121, b122, b123, b124, b125, b126, b127, b128, b129, b130, b131, b132, b133, b134, b135, b136, b137, b138, b139, b140, b141, b142, b143, b144, b145, b146, b147, b148, b149, b150, b151, b152, b153, b154, b155, b156, b157, b158, b159, b160, b161, b162, b163, b164, b165, b166, b167, b168, b169, b170, b171, b172, b173, b174, b175, b176, b177, b178, b179, b180, b181, b182, 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(19)日本国特許庁 (J P)

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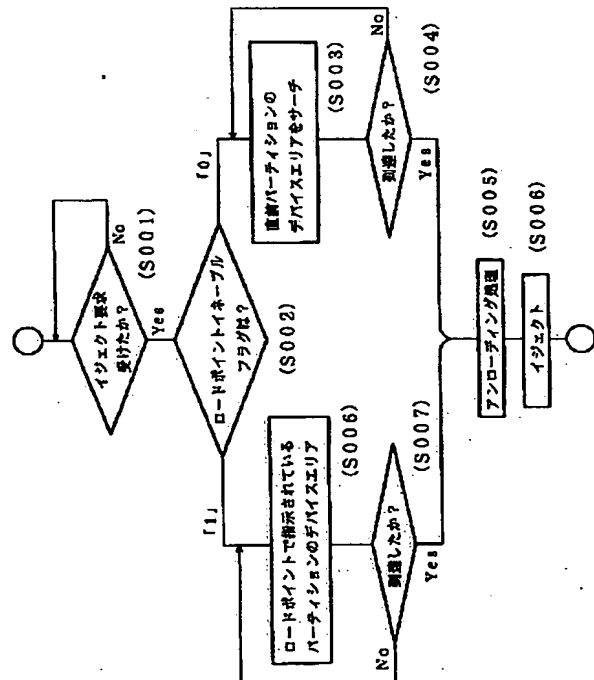
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(54)【発明の名称】 テープドライブ装置、記録媒体

## (57)【要約】

【課題】 指定した位置でのアンロードを実現する。

【解決手段】 ホストコンピュータからイジェクトコマンドを受信すると、ロードポイントイネーブルフラグFL311bの内容の判別を行い(S001、S002)、ロードポイントイネーブルフラグFL311aが例えば「1」、すなわちロードポイントFL311aが有効である判別した場合には、ロードポイントFL311aで指定されているパーティションの直前のデバイスエリアまたはオプションデバイスエリアのサーチを開始する(S006)。そして、所望するデバイスエリアに到達した場合に(S007)、所要のアンローディング処理を行って、テープカセット1の排出を行う(S005、S006)。



【0006】また、磁気テープの記録面を保護するために、テープカセットの排出時に磁気テープを先頭付近まで巻き戻すようにした場合、次回テープカセットを装填した後、例えば磁気テープの物理的な中央部分または終端部分において記録/再生を行うためには、先頭からテープを走行させて所望する位置に記録/再生位置を移動させる必要がある。これはテープ長が長いほど多大な時間を要することになる。

【0007】このため、例えばテープカセットの用途などに最適な磁気テープの排出位置選択することができるようにして、テープカセットの使い勝手の向上、及び保管性の向上を図ることができるテープドライブ装置が求められている。

【0008】

【課題を解決するための手段】本発明はこのような問題を解決するために、テープドライブ装置として磁気テープが収納されたテープカセットが装填された際に、前記磁気テープを走行させるとともに前記磁気テープに対して情報の記録または再生を行なうことができるテープドライブ手段と、装填された前記テープカセットの前記磁気テープに対する記録または再生を管理するための管理情報を記録するメモリが備えられている場合に、そのメモリに対して所要の通信処理を行い管理情報の読み出しまたは書込みを行なうことができるメモリドライブ手段と、前記メモリから前記磁気テープに複数形成されている排出管理領域のいずれか一つを特定する排出位置情報を検出する排出情報検出手段と、前記テープカセットの排出を行う場合に前記磁気テープを走行させ、前記磁気テープを前記排出位置情報に基づいた特定の排出管理領域に移動させる排出管理領域サーチ手段と、前記排出管理領域サーチ手段によって前記磁気テープが前記特定の排出管理領域に移動した場合に、前記テープカセットを排出する排出制御手段を備える。

【0009】また、磁気テープが収納されたテープカセットと、前記テープカセットに備えられ、前記磁気テープに対する記録または再生を管理するための管理情報を記録するメモリを備えた記録媒体において、前記磁気テープに複数の排出管理領域が形成されているとともに、前記メモリに複数の排出管理領域のなかの特定の排出管理領域を示す排出位置情報を記憶する。

【0010】本発明のテープドライブ装置によれば、テープカセットを排出する場合に磁気テープの位置を特定の排出管理領域とすることができるので、磁気テープの排出位置を選択することができるようになる。また、本発明の記録媒体としては排出位置情報をメモリ(MIC)に記憶しているので、当該記録媒体を装填したテープドライブ装置に対して前記排出位置情報を供給することができるようになる。

【0011】

【発明の実施の形態】以下、本発明の実施の形態につい

て説明する。ここで、先に本出願人により不揮発性メモリが設けられたテープカセット及び、このメモリ付きテープカセットに対応してデジタルデータの記録/再生が可能とされるテープドライブ装置(テープストリーマドライブ)についての発明が各種提案されているが、本発明は、これらメモリ付きテープカセット及びテープストリーマドライブからなるデータストレージシステムを本発明に適用したものとされる。なお、テープカセットに備えられる不揮発性メモリについては、MIC(Memory In Cassette)ということにする。説明は次の順序で行う。

1. テープカセットの構成
2. テープストリーマドライブの構成
3. 磁気テープ上のデータ構成
4. IDエリア
5. MICのデータ構造
6. アンロード

【0012】1. テープカセットの構成

まず、本例のテープストリーマドライブに対応するMIC付のテープカセットについて図2及び図3を参照して説明する。図2は、テープカセットの内部構造を概念的に示すものとされ、この図に示すテープカセット1の内部にはリールハブ2A、2Bが設けられ、この両リールハブ2A及び2B間にテープ幅8mmの磁気テープ3が巻装される。

【0013】このテープカセット1には不揮発性メモリであるMIC4が設けられており、このMIC4のモジュールからは5個の端子5A、5B、5C、5D、5Eが導出され、それぞれ電源端子、データ入力端子、クロック入力端子、アース端子、予備端子等として構成されている。詳しくは後述するが、このMIC4には、テープカセットごとの製造年月日や製造場所、テープの厚さや長さ、材質、テープ3上の形成される各パーティションごとの記録データの使用履歴等に関連する情報、ユーザ情報等が記憶される。なお、本明細書ではこれらのMIC4に格納される各種情報は『管理情報』ともいうことにする。

【0014】図3は、テープカセット1の外観例を示すものとされ、筐体全体は上側ケース6a、下側ケース6b、及びガードパネル8からなり、通常の8ミリVTRに用いられるテープカセットの構成と基本的には同様となっている。このテープカセット1の側面のラベル面9には、端子ピン7A、7B、7C、7D、7Eが設けられており、上記図2にて説明した各端子5A、5B、5C、5D、5Eとそれぞれ接続されている。すなわち、本例では、テープカセット1は次に説明するテープストリーマドライブ10と、上記端子ピン7A、7B、7C、7D、7Eを介して物理的に接触してデータ信号等の相互伝送が行われるものとされる。

【0015】2. テープストリーマドライブの構成

## BACKGROUND OF THE INVENTION

### [0002] 1. Field of the Invention

[0003] The present invention relates to a tape driving apparatus and a recording medium.

### [0004] 2. Description of the Related Art

[0005] As a driving apparatus capable of recording/reproducing digital data with respect to a magnetic tape, the so-called tape streaming drive is known. Such a tape streaming drive can have huge recording capacity of, for example, several tens to several hundreds gigabytes although depending upon the tape length of the tape cassette as a medium. Thus, the tape streaming drive is widely used for, for example, backing up data recorded on a medium such as a hard disk of a computer main body. Besides, the tape streaming drive is suitable also in the case where it is used for storing picture data, etc. of large data size.

[0006] As the foregoing tape streaming drive, there has been proposed such a tape streaming drive that a tape cassette of a 8 mm VTR is used as a recording medium, and recording/reproduction of data is carried out by employing a helical scan system with a recording head and a reproducing head provided at a required position of a rotary drum.

[0007] In the foregoing tape streaming drive using the tape cassette of the 8 mm VTR, for example, SCIS (Small Computer System Interface) is used as the input/output interface for recording/reproduction data.

[0008] At the time of recording, data supplied from, for example, a host computer are inputted through the SCSI interface, and the input data are subjected to predetermined compression processing and encoding processing and are recorded to the magnetic tape of the tape cassette.

[0009] At the time of reproduction, data of the magnetic tape are read out and are subjected to necessary decoding processing, and are transmitted to the host computer through the SCSI interface.

[0010] As the magnetic tape, one having a considerable length is required to obtain large capacity. Thus, recording/reproduction using such a long magnetic tape as a recording medium is carried out after movement to a desired position on the magnetic tape. Then, in the case where the tape cassette is ejected from the tape streaming drive, after movement is made toward an ejection management area formed in the vicinity of the position where the recording/reproduction has been carried out, the ejecting operation is carried out. Further, when the tape cassette is loaded into the tape streaming drive, movement is made from the ejection management area at the time of the ejection to a desired position where the recording/reproduction is carried out. That is, since the ejection position becomes coincident with the loading position, it becomes suitable for the case where the recording/reproduction is carried out by again using the previously used recording area.

[0011] However, in this case, in the tape cassette, the magnetic tape is kept, for example, for a long period in the state where the magnetic tape is led out from a reel hub, that is, the recording surface is exposed. Thus, there is a case where the recording surface is deteriorated by moisture or the like.

[0012] Besides, in the case where the magnetic tape is rewound to the vicinity of the head at the time of ejection of the tape cassette for the purpose of protecting the recording surface of the magnetic tape, in order to carry out the recording/reproduction at, for example, the physical center portion or end portion of

the magnetic tape after the subsequent loading of the tape cassette, it is necessary to move the recording/reproduction position to a desired position by running the tape from the head. If the length of the tape is long, this requires large time.

[0013] Thus, such a tape driving apparatus has been required that it becomes possible to select the ejection position of the magnetic tape optimum for use in, for example, the tape cassette, so that the tape cassette becomes easy to handle and the storage property is improved.

#### SUMMARY OF THE INVENTION

[0014] The present invention has been made to solve the foregoing problem and provides a tape driving apparatus comprising tape drive means for running a magnetic tape when a tape cassette containing the magnetic tape is loaded and for carrying out recording or reproduction of information with respect to the magnetic tape; memory drive means for, in a case where a memory to record management information for managing recording or reproduction with respect to the magnetic tape of the loaded tape cassette is provided, reading or writing the management information by carrying out necessary communication processing to the memory; ejection information detecting means for detecting ejection position information specifying one of a plurality of ejection management areas formed on the magnetic tape from the memory; ejection management area search means for moving the magnetic tape to the specific ejection management area based on the ejection position information by running the magnetic tape in a case where the tape cassette is ejected; and ejection control means for ejecting the tape cassette in a case where the magnetic tape is moved to the specific ejection management area by the ejection management area search means.

[0015] Moreover, a recording medium comprises a tape cassette housing a magnetic tape, and a memory which is provided at the tape cassette and records management information for managing recording or reproduction with respect to the magnetic tape, in which a plurality of ejection management areas are formed on the magnetic tape, and the memory stores ejection position information to indicate a specific ejection management area among the plurality of ejection management areas.

[0016] According to the tape driving apparatus of the invention, since the position of the magnetic tape can be made the specific ejection management area in the case where the tape cassette is ejected, it becomes possible to select the ejection position of the magnetic tape.

[0017] Besides, in the recording medium of the invention, since the ejection position information is stored in the memory (MIC), it becomes possible to supply the ejection position information to the tape driving apparatus in which the recording medium is loaded.

#### BRIEF DESCRIPTION OF THE DRAWINGS

[0018] FIG. 1 is an explanatory view schematically showing an internal structure of a tape cassette of an embodiment.

[0019] FIG. 2 is a perspective view showing the outer appearance of the tape cassette of the embodiment.

[0020] FIG. 3 is a block diagram of a tape streaming drive of an embodiment of the invention.

[0021] FIGS. 4A to 4D are explanatory views of the data structure on the magnetic tape of the tape cassette of the embodiment.

[0022] FIGS. 5A to 5C are explanatory views of the track structure on the magnetic tape of the tape cassette of the embodiment.

[0023] FIGS. 6A to 6C are explanatory views of the area structure of the magnetic

tape of the tape cassette of the embodiment.

[0024] FIG. 7 is an explanatory view of an ID area on the magnetic tape of the tape cassette of the embodiment.

[0025] FIG. 8 is an explanatory view of a physical block address of the ID area of the tape cassette of the embodiment.

[0026] FIG. 9 is an explanatory view of ID area information of the tape cassette of the embodiment.

[0027] FIG. 10 is an explanatory view of the definition of the area ID of the tape cassette of the embodiment.

[0028] FIG. 11 is an explanatory view of data structure of an MIC of an embodiment.

[0029] FIG. 12 is an explanatory view of manufacture information of the MIC of the embodiment.

[0030] FIG. 13 is an explanatory view of memory management information of the MIC of the embodiment.

[0031] FIG. 14 is an explanatory view of volume tag of the MIC of the embodiment.

[0032] FIGS. 15A and 15B are explanatory views of volume information of the MIC of the embodiment.

[0033] FIGS. 16A and 16B are explanatory views of eject status of the MIC of the embodiment.

[0034] FIGS. 17A and 17B are explanatory views of cell structure of the MIC of the embodiment.

[0035] FIG. 18 is an explanatory view of partition information cell of the MIC of the embodiment.

[0036] FIG. 19 is an explanatory view of partition information of the MIC of the embodiment.

[0037] FIG. 20 is a view for explaining an example of processing carried out by a system controller in the case where unload processing of a tape cassette and ejection are carried out.

[0038] FIG. 21 is a schematic view for explaining transition in the case where unloading is carried out in an optional device area just before a partition.

[0039] FIGS. 22A and 22B are schematic views for explaining transition in the case where unloading is carried out in a device area or an optional device area pointed by a load pointer.

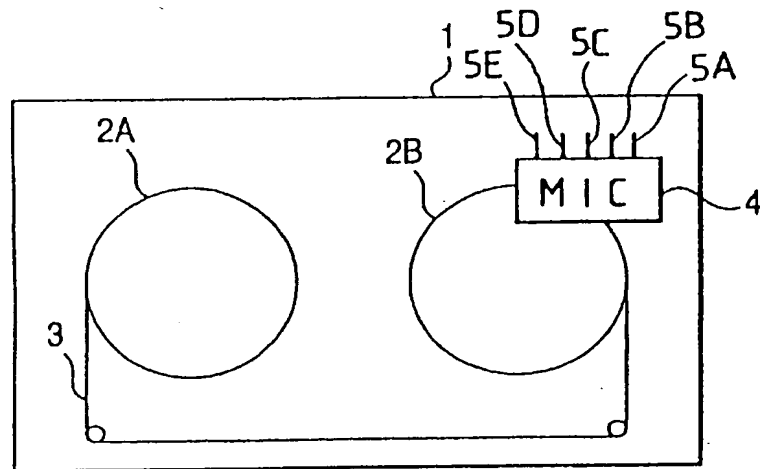
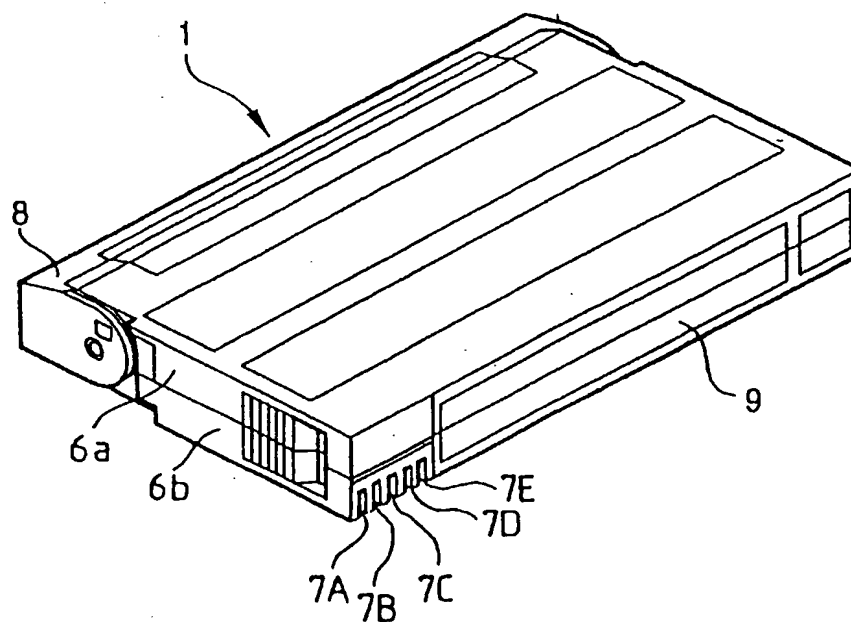
*FIG. 1**FIG. 2*

FIG. 3

